439174

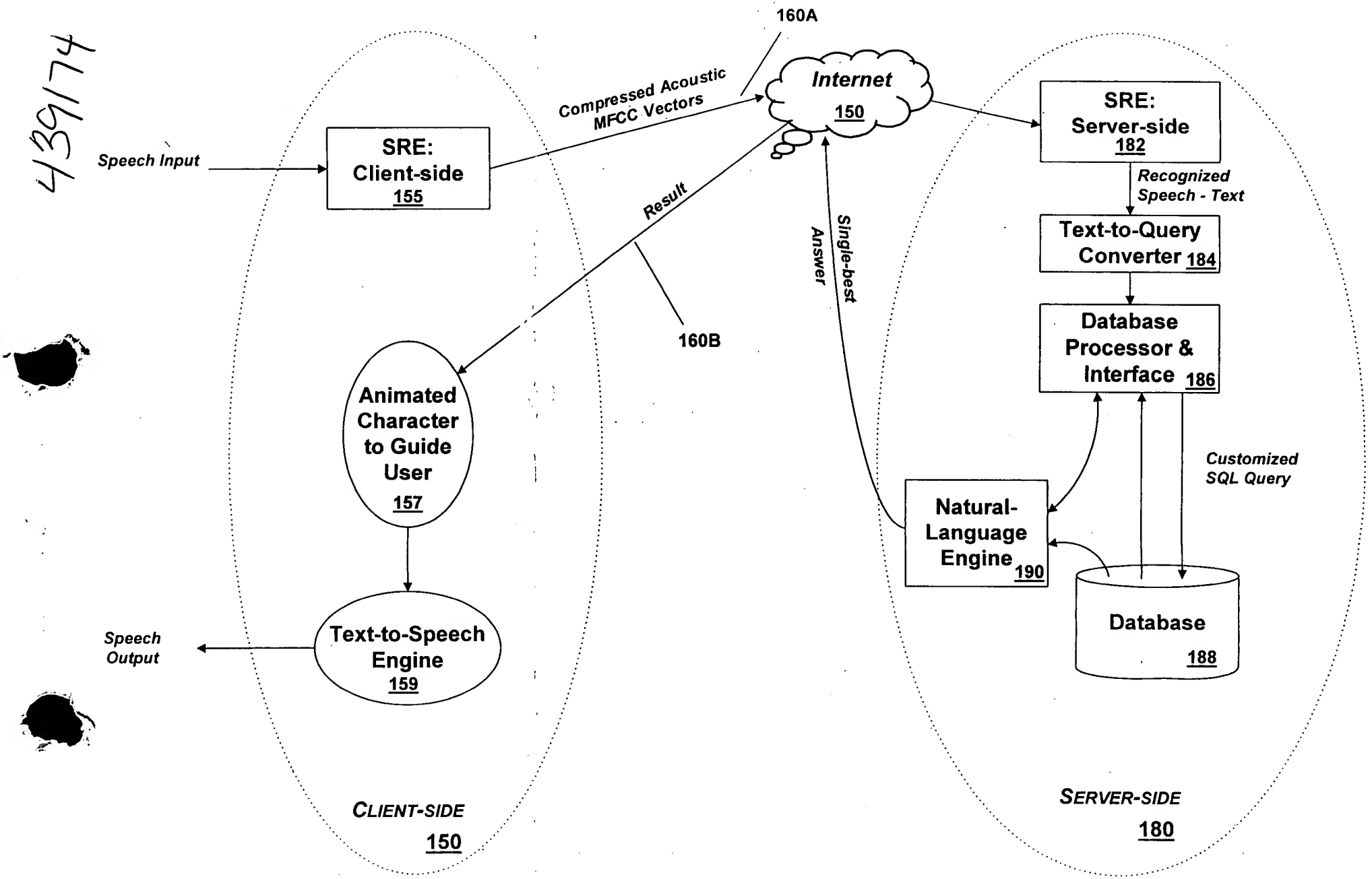

160A
Internet
150
Compressed Acoustic
MFCC Vectors
Speech Input
SRE:
Client-side
155
Result
160B
SRE:
Server-side
182
Recognized
Speech - Text
Text-to-Query
Converter 184
Single-best
Answer
Database
Processor &
Interface 186
Animated
Character
to Guide
User
157
Customized
SQL Query
Natural-
Language
Engine
190
Database
188
Speech
Output
Text-to-Speech
Engine
159
CLIENT-SIDE
150
SERVER-SIDE
180

Fig. 1

Figure 2: CLIENT-SIDE SYSTEM LOGIC

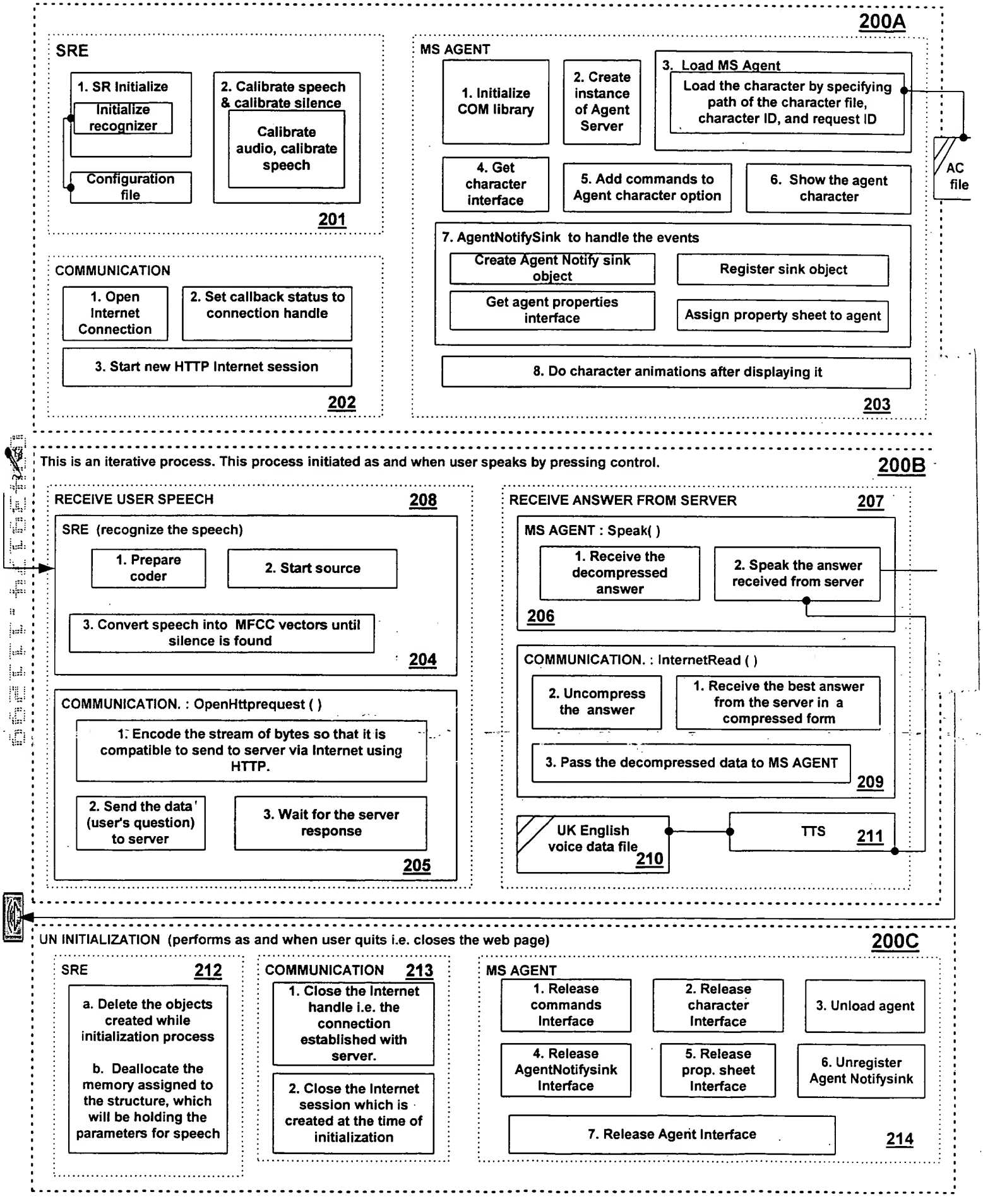


Fig. 2-2: Client-side Initialization

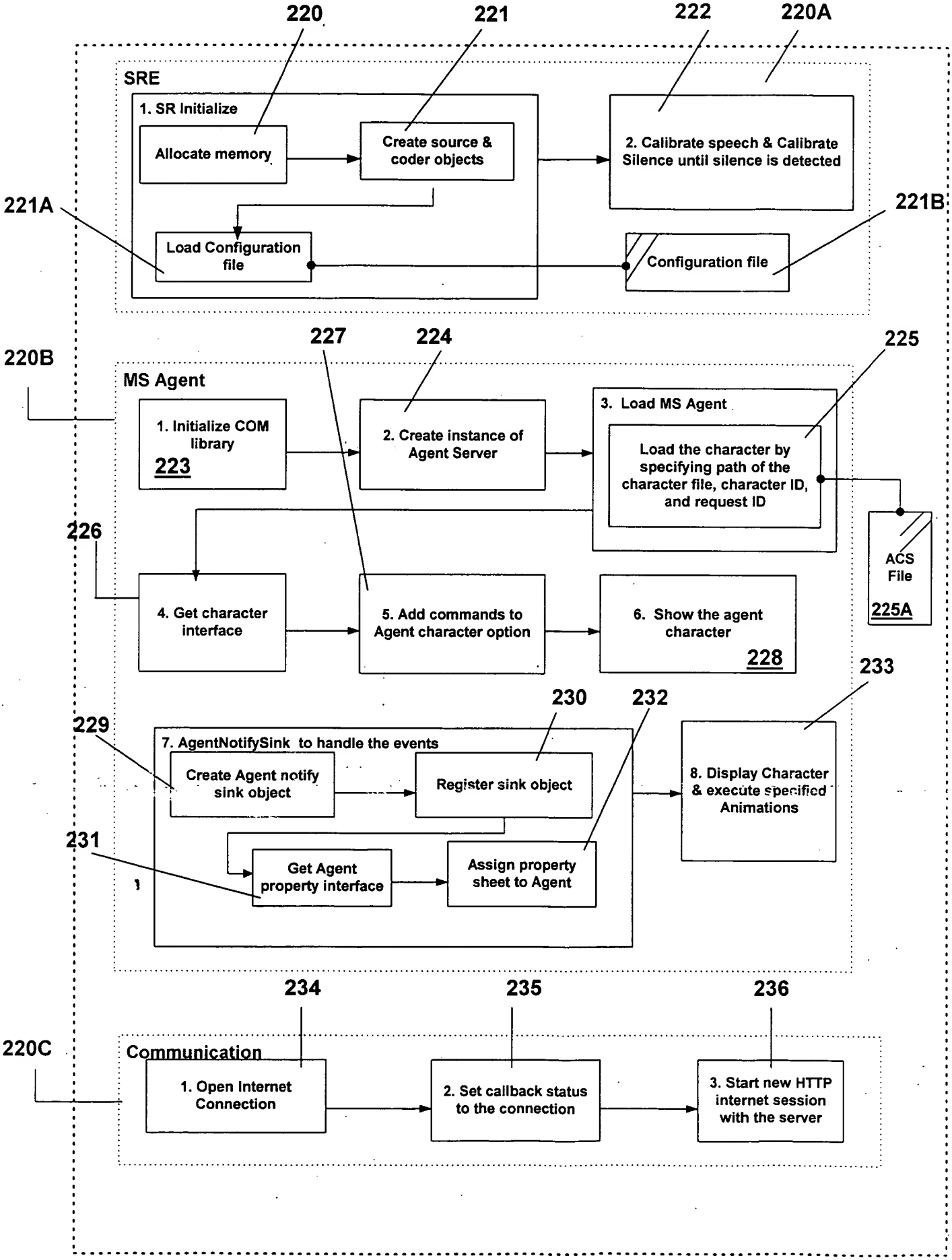


Fig. 3: Client-side Iterative Process

Revised: 9/13/99

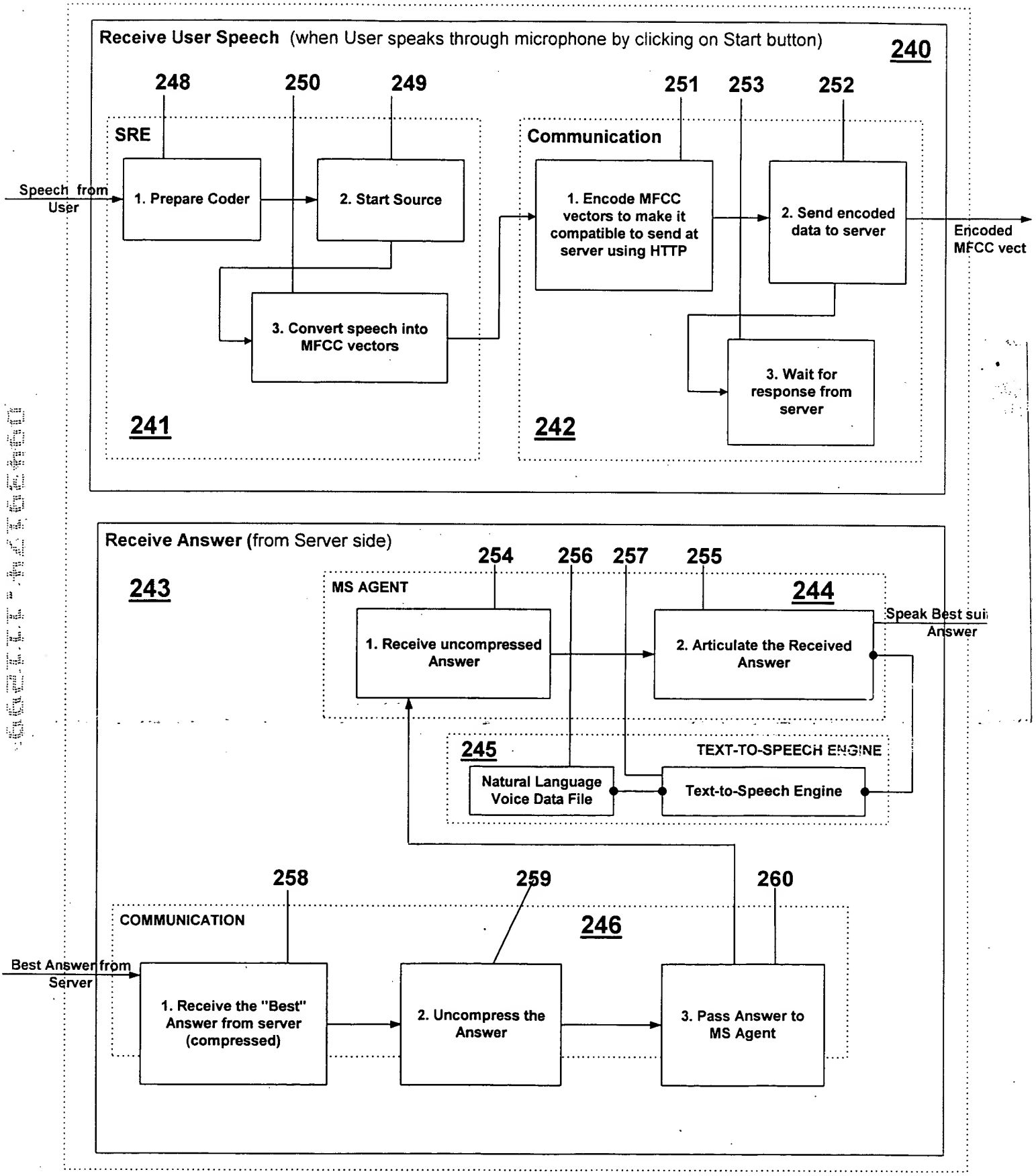


Fig. 4: Client-side Un-Initialization

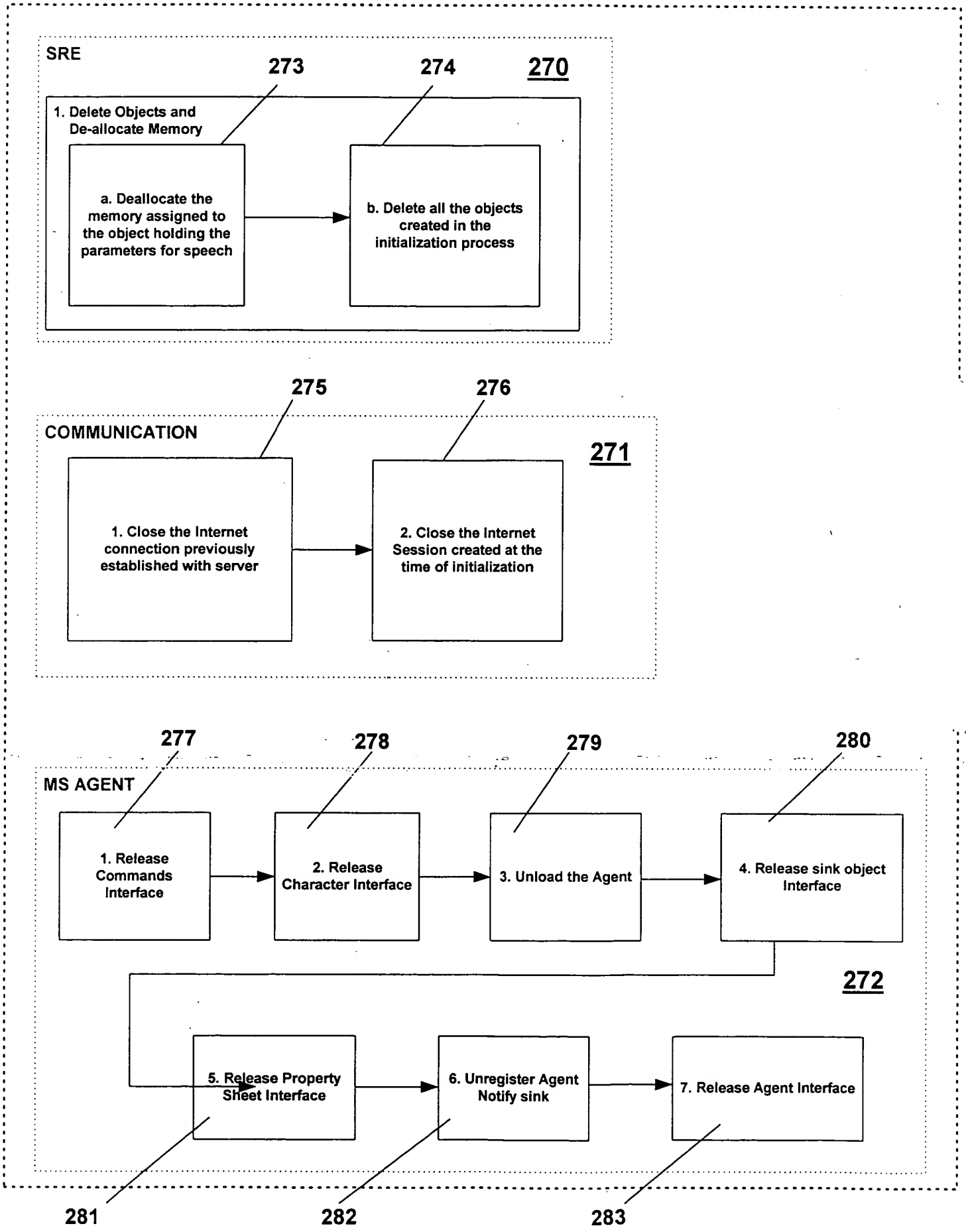
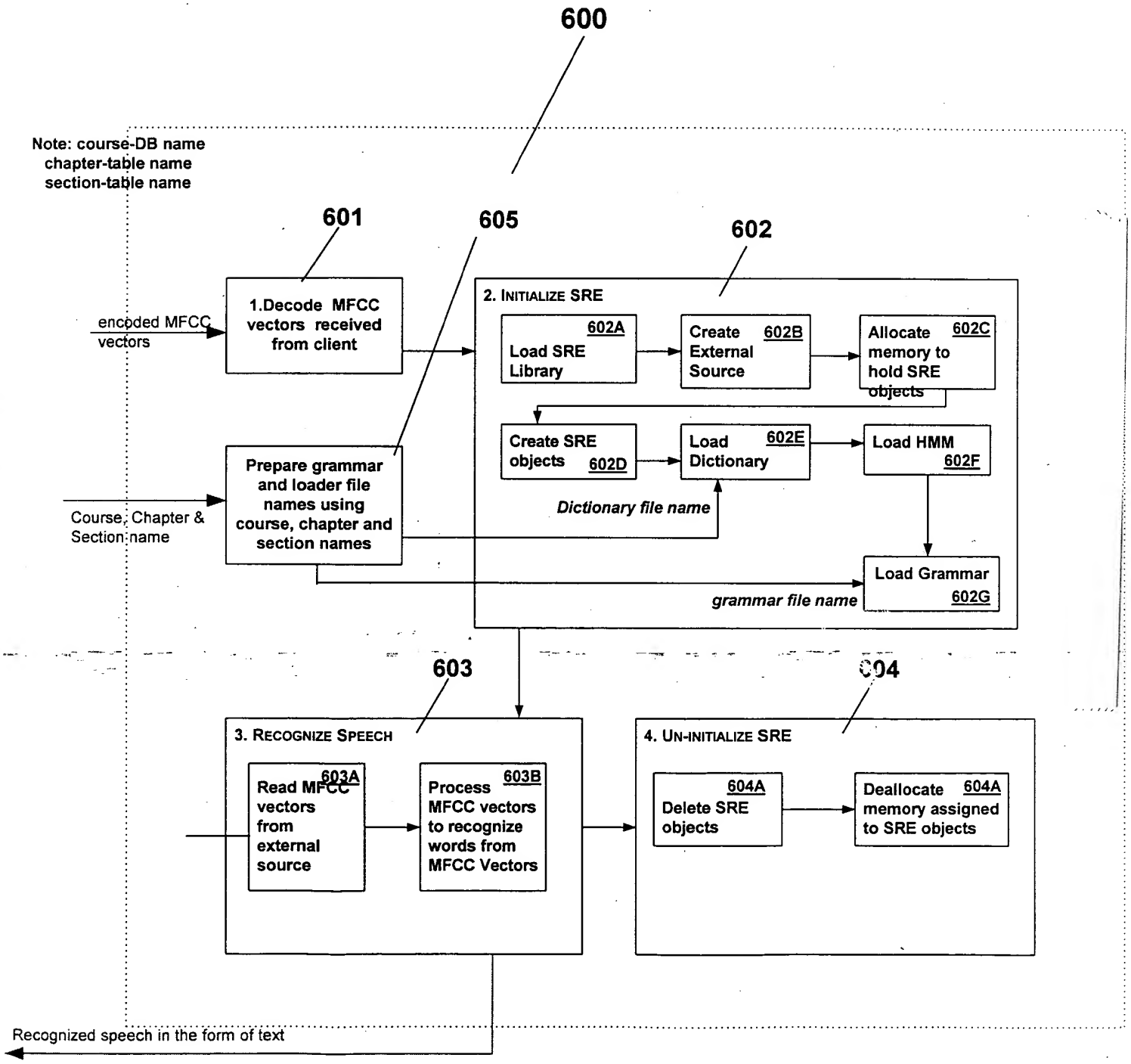


Fig. 4A: Distributed Component of SRE at Server-Side



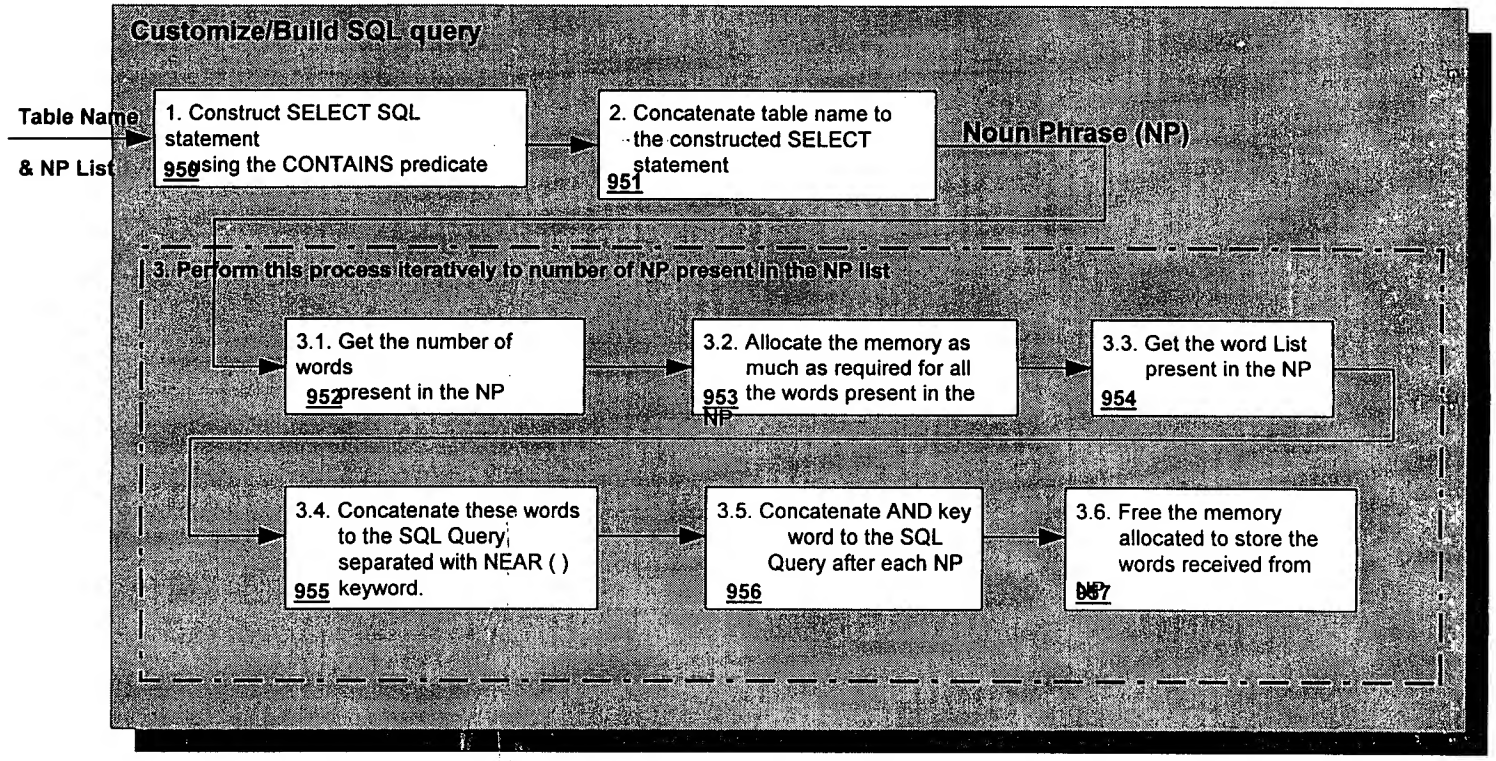


Fig. 4B: Build of SQL Query

Fig. 4C: Server-side DBProcess DLL

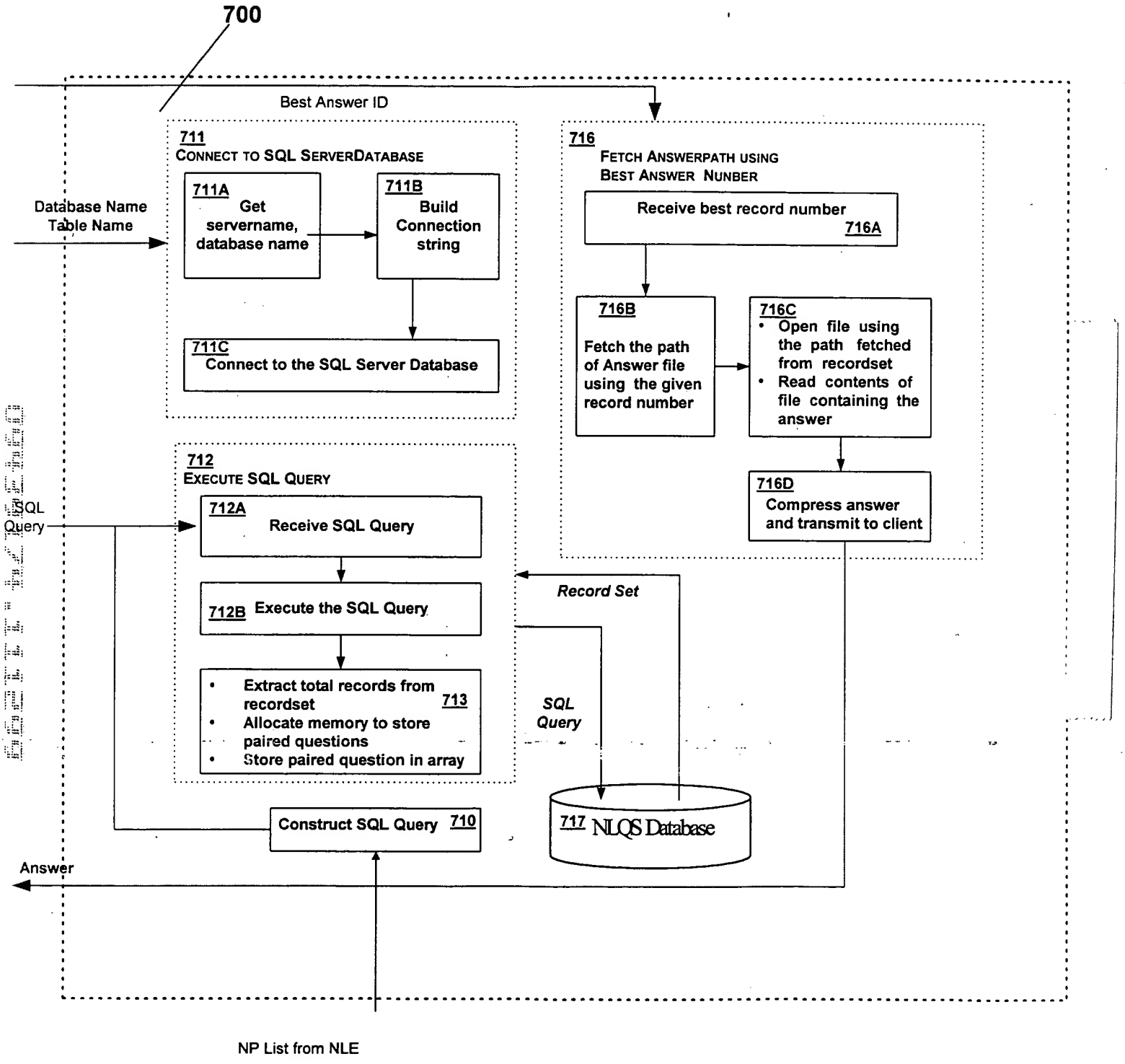


Fig. 4D: Interface Logic between NLE and DBProcess.DLL

Note: PQ - Paired Question
NP- Noun Phrase
Red Line - I / O

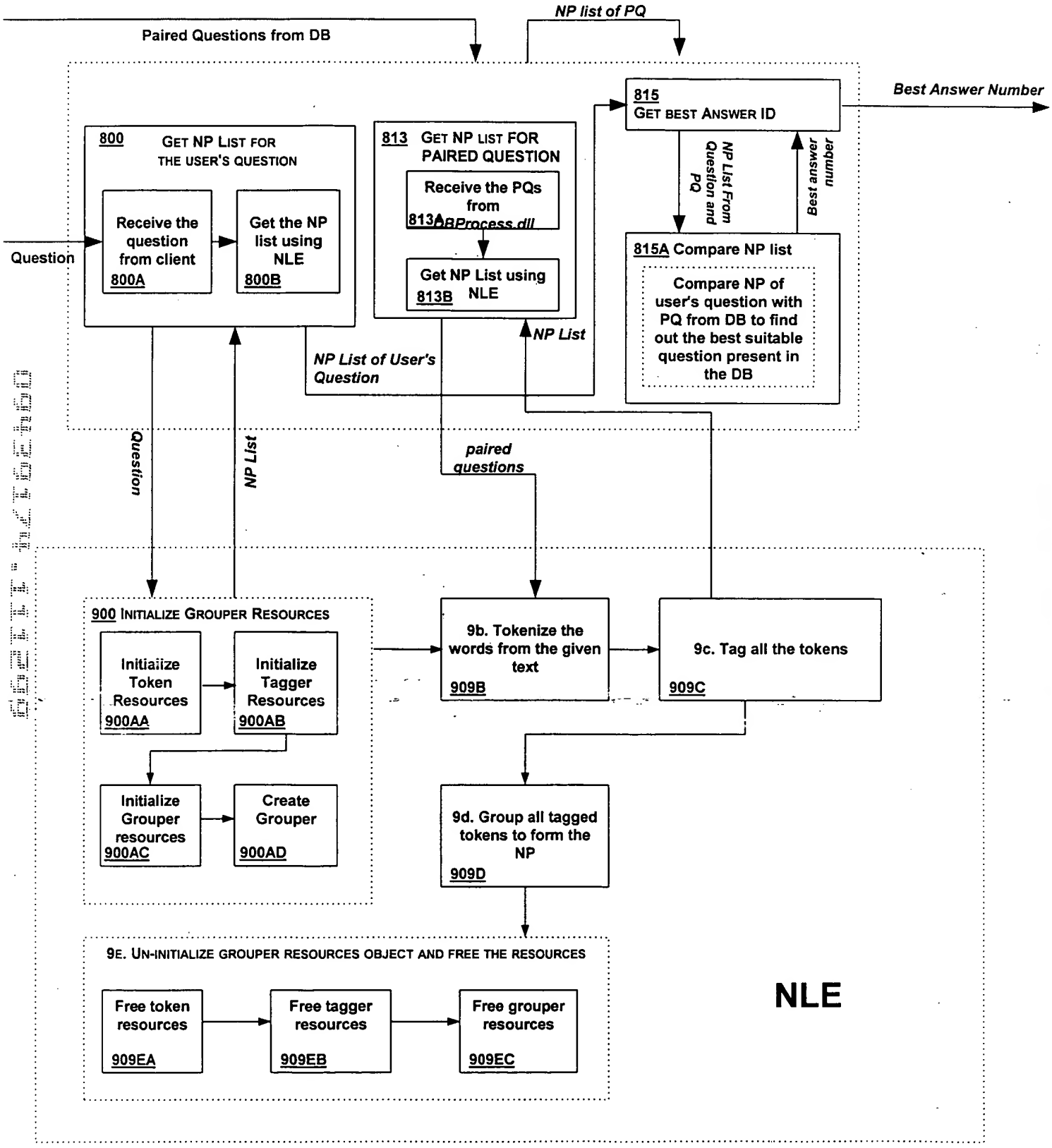
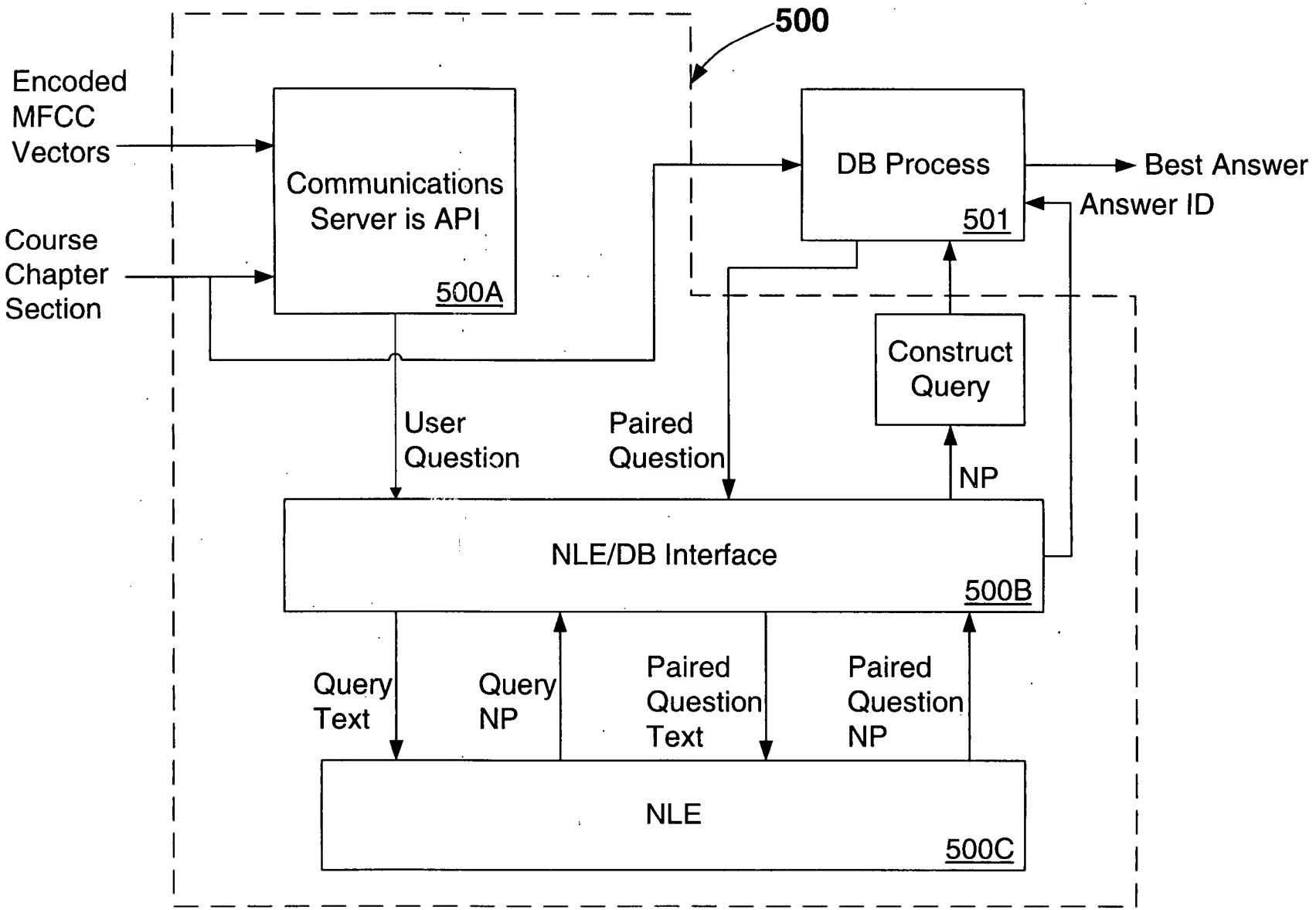


Fig. 5


500
Encoded MFCC Vectors
Course Chapter Section
Communications Server is API
500A
DB Process
501
Best Answer
Answer ID
Construct Query
User Question
Paired Question
NP
NLE/DB Interface
500B
Query Text
Query NP
Paired Question Text
Paired Question NP
NLE
500C

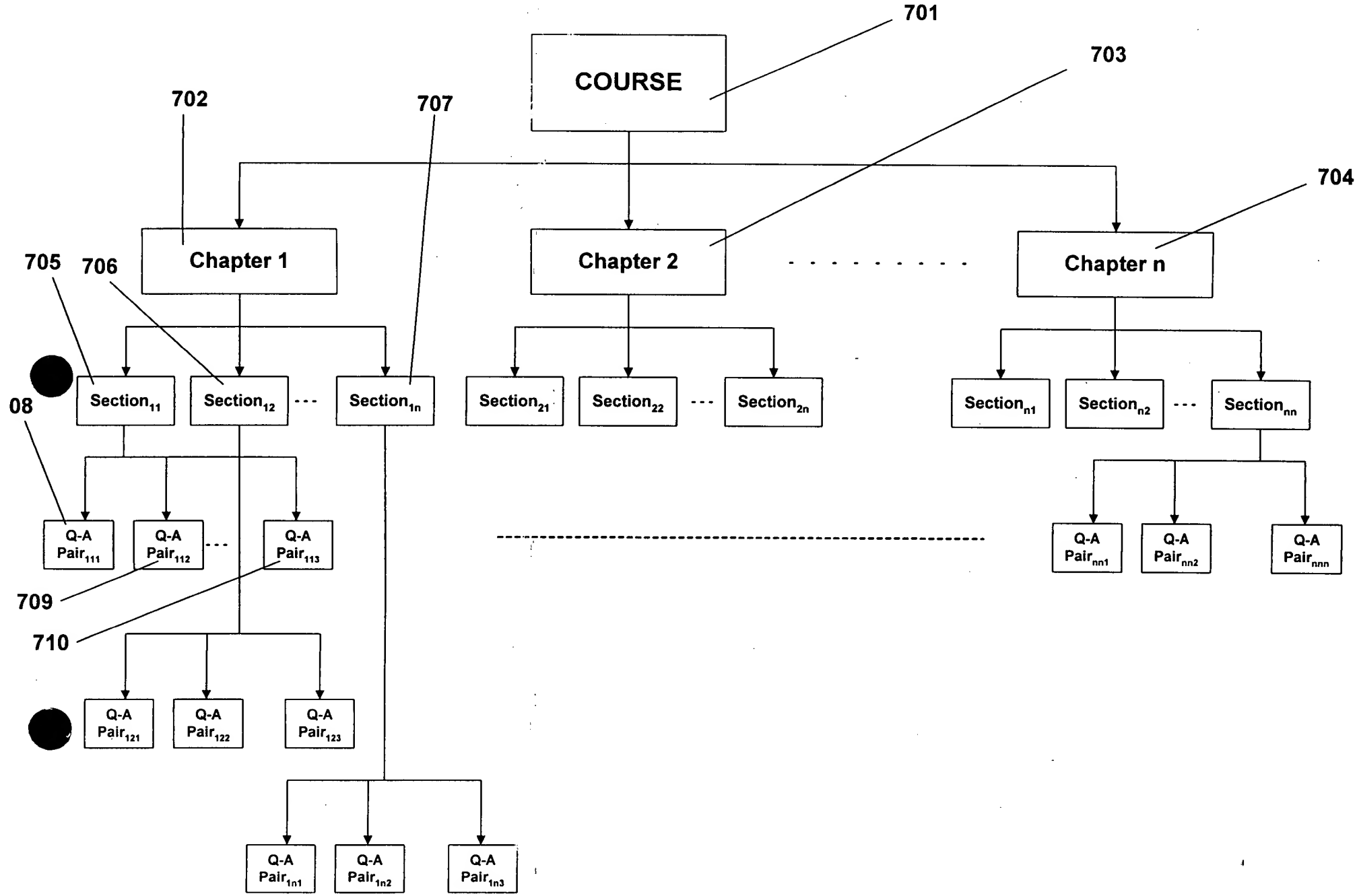


Figure 7

09439174.111299

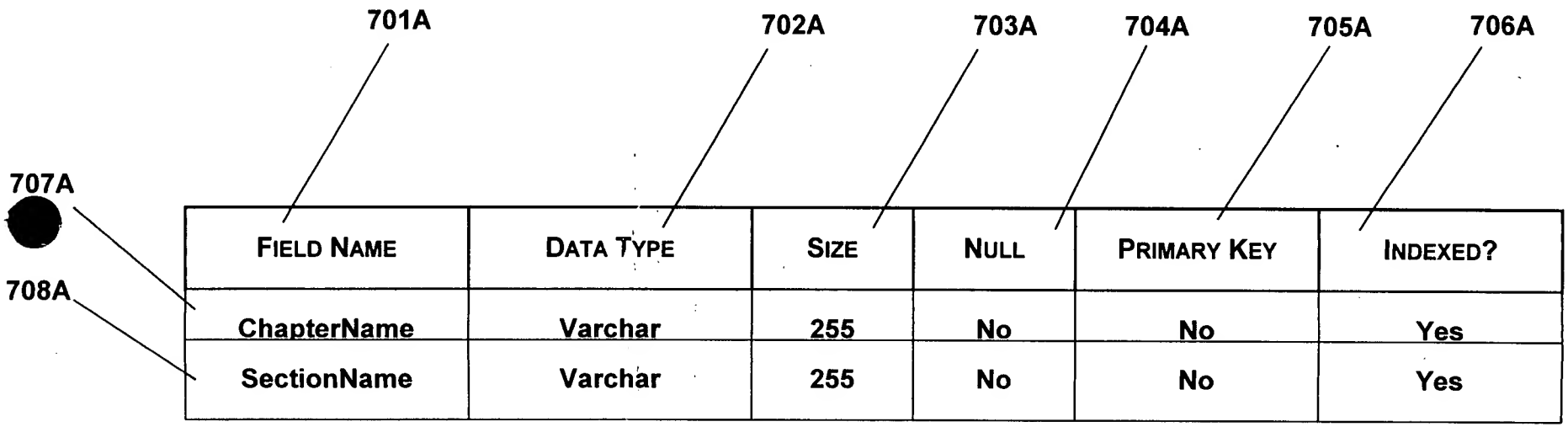
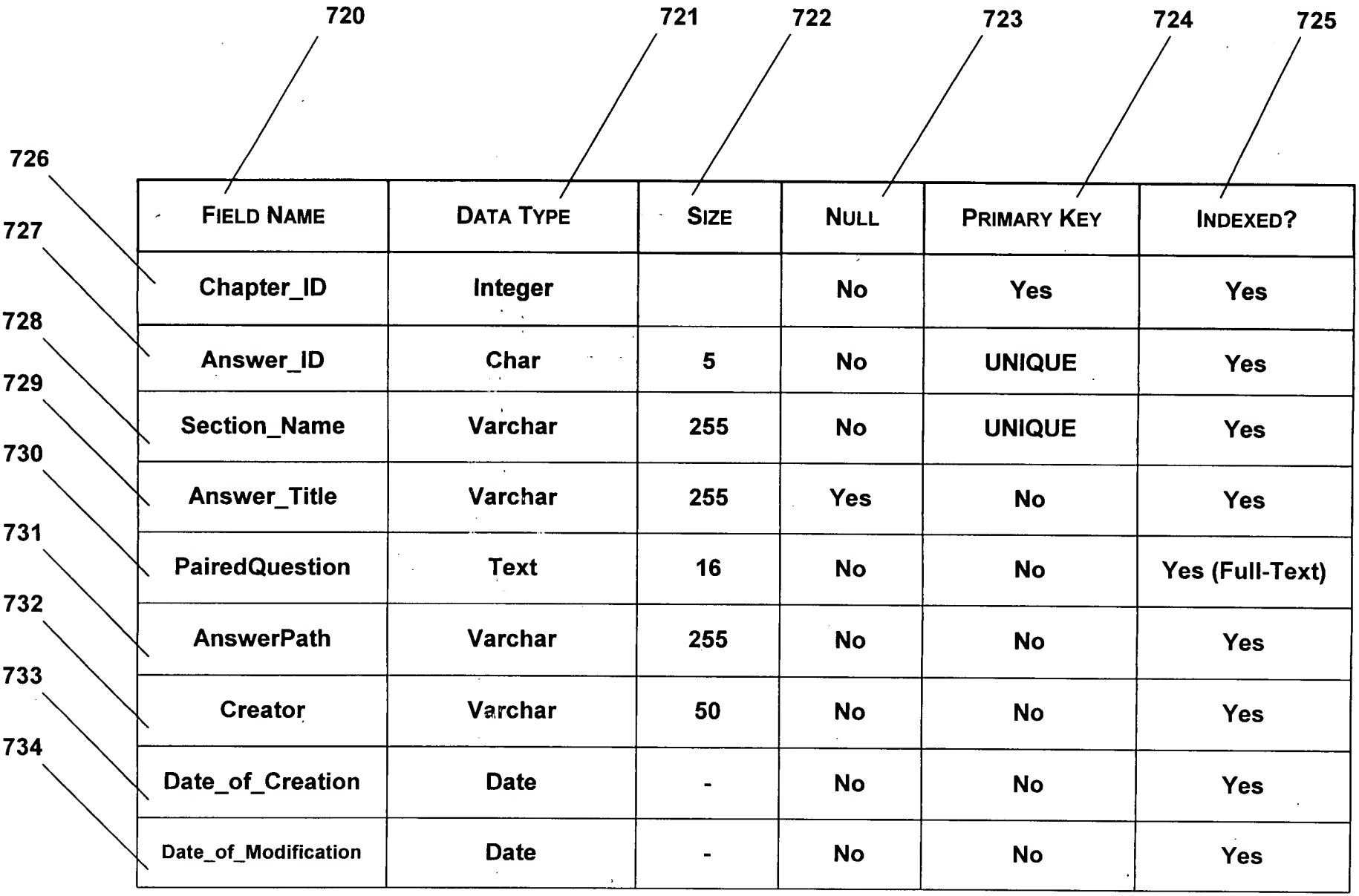

701A
702A
703A
704A
705A
706A
707A
708A
FIELD NAME
DATA TYPE
SIZE
NULL
PRIMARY KEY
INDEXED?
ChapterName
Varchar
255
No
No
Yes
SectionName
Varchar
255
No
No
Yes

Figure 7A



Field Name	Data Type	Size	Null	Primary Key	Indexed?
Chapter_ID	Integer		No	Yes	Yes
Answer_ID	Char	5	No	UNIQUE	Yes
Section_Name	Varchar	255	No	UNIQUE	Yes
Answer_Title	Varchar	255	Yes	No	Yes
PairedQuestion	Text	16	No	No	Yes (Full-Text)
AnswerPath	Varchar	255	No	No	Yes
Creator	Varchar	50	No	No	Yes
Date_of_Creation	Date	-	No	No	Yes
Date_of_Modification	Date	-	No	No	Yes

Figure 7B

09439174.111299

730

731

Field	Description
AnswerID	An integer - automatically incremented for user convenience
Section_Name	Name of section to which the particular record belongs. This field along with AnswerID has to be made primary key
Answer_Title	A short description of the answer
PairedQuestion	Contains one or more combinations of questions for the related answer whose path is stored in the next column AnswerPath
AnswerPath	Contains the path of text file, which contains theanswer to the rleated qusetions stored in the previous column
Creator	Name of content creator
Date_of_Creation	Date on which content has been added
Date_of_Modification	Date on which content has been changed or modified

732

733

734

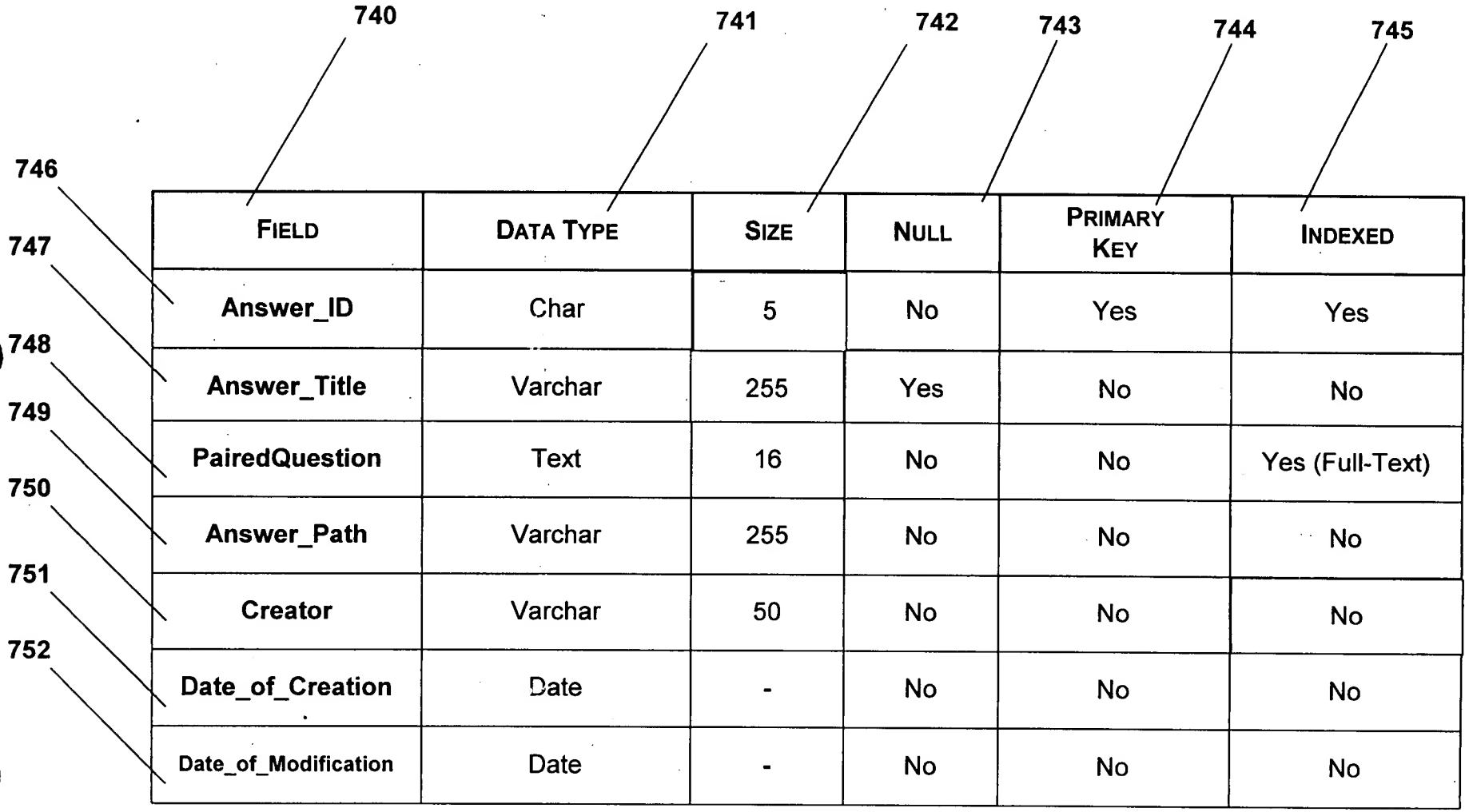
736

737

738

739

Figure 7C



Field	Data Type	Size	Null	Primary Key	Indexed
Answer_ID	Char	5	No	Yes	Yes
Answer_Title	Varchar	255	Yes	No	No
PairedQuestion	Text	16	No	No	Yes (Full-Text)
Answer_Path	Varchar	255	No	No	No
Creator	Varchar	50	No	No	No
Date_of_Creation	Date	-	No	No	No
Date_of_Modification	Date	-	No	No	No

Figure 7D

09130174 .111299

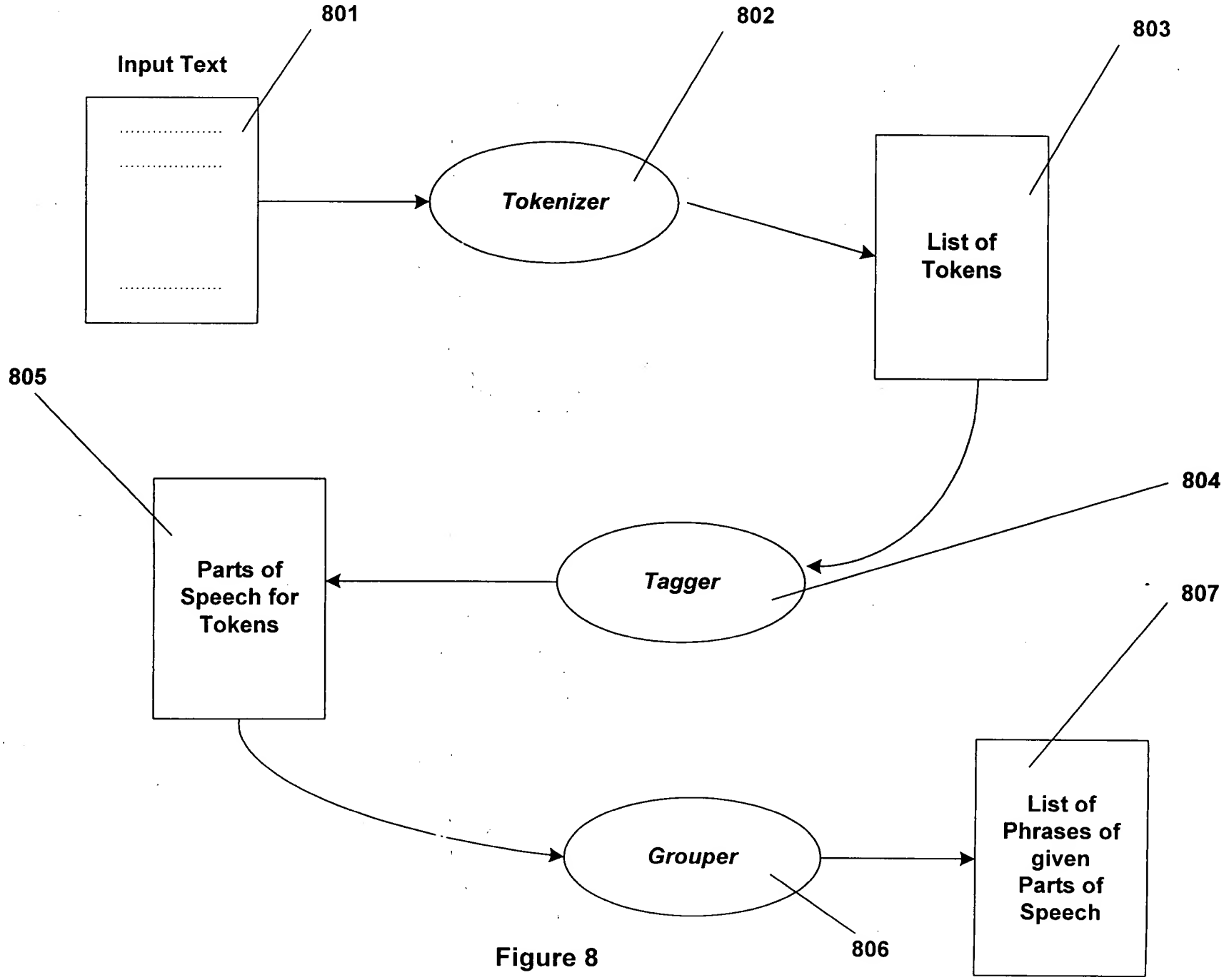

801
Input Text
802
Tokenizer
803
List of Tokens
805
Parts of Speech for Tokens
804
Tagger
807
Grouper
List of Phrases of given Parts of Speech
806

Figure 8

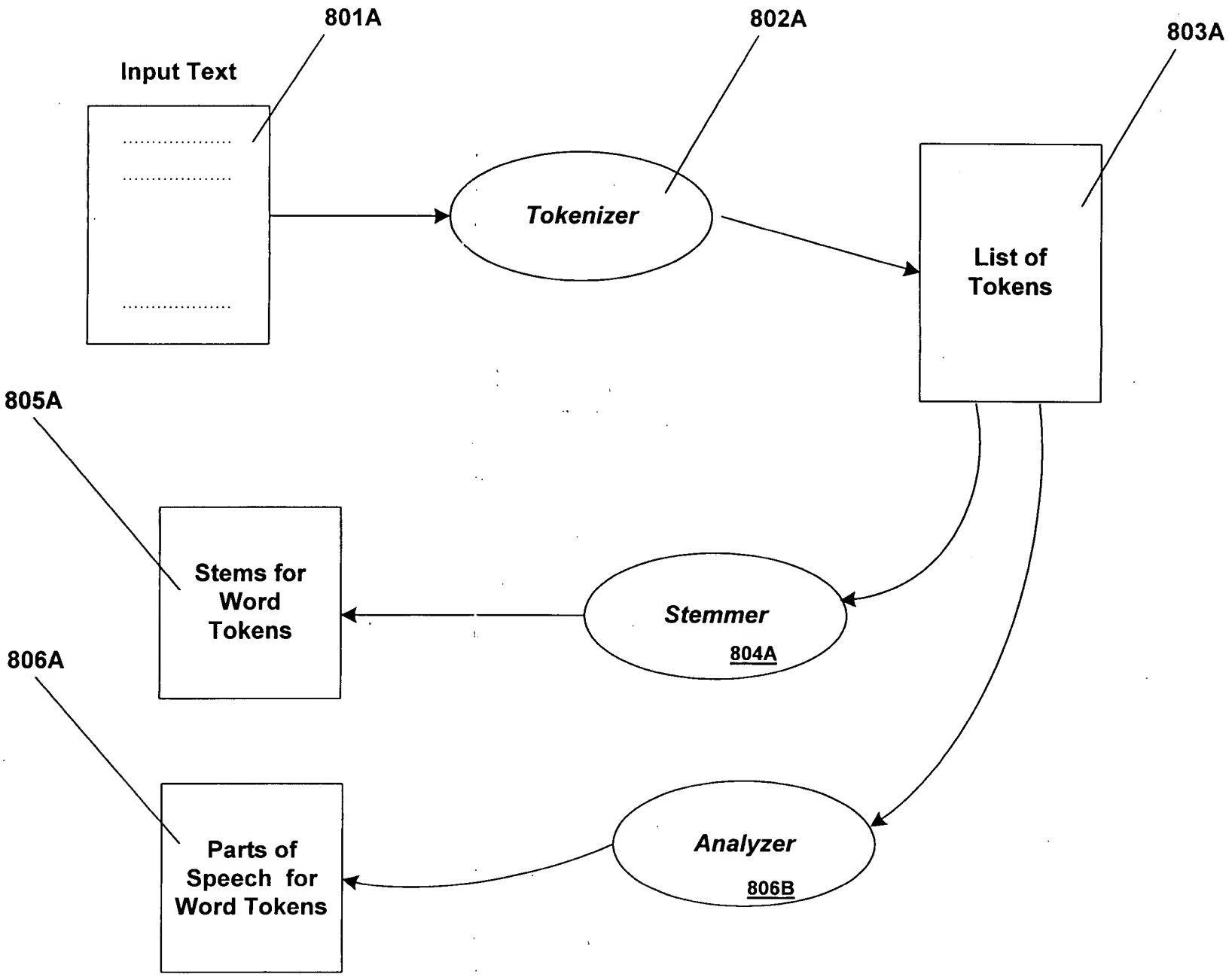

801A
Input Text
802A
Tokenizer
803A
List of Tokens
805A
Stems for Word Tokens
Stemmer
804A
806A
Parts of Speech for Word Tokens
Analyzer
806B

Figure 8A

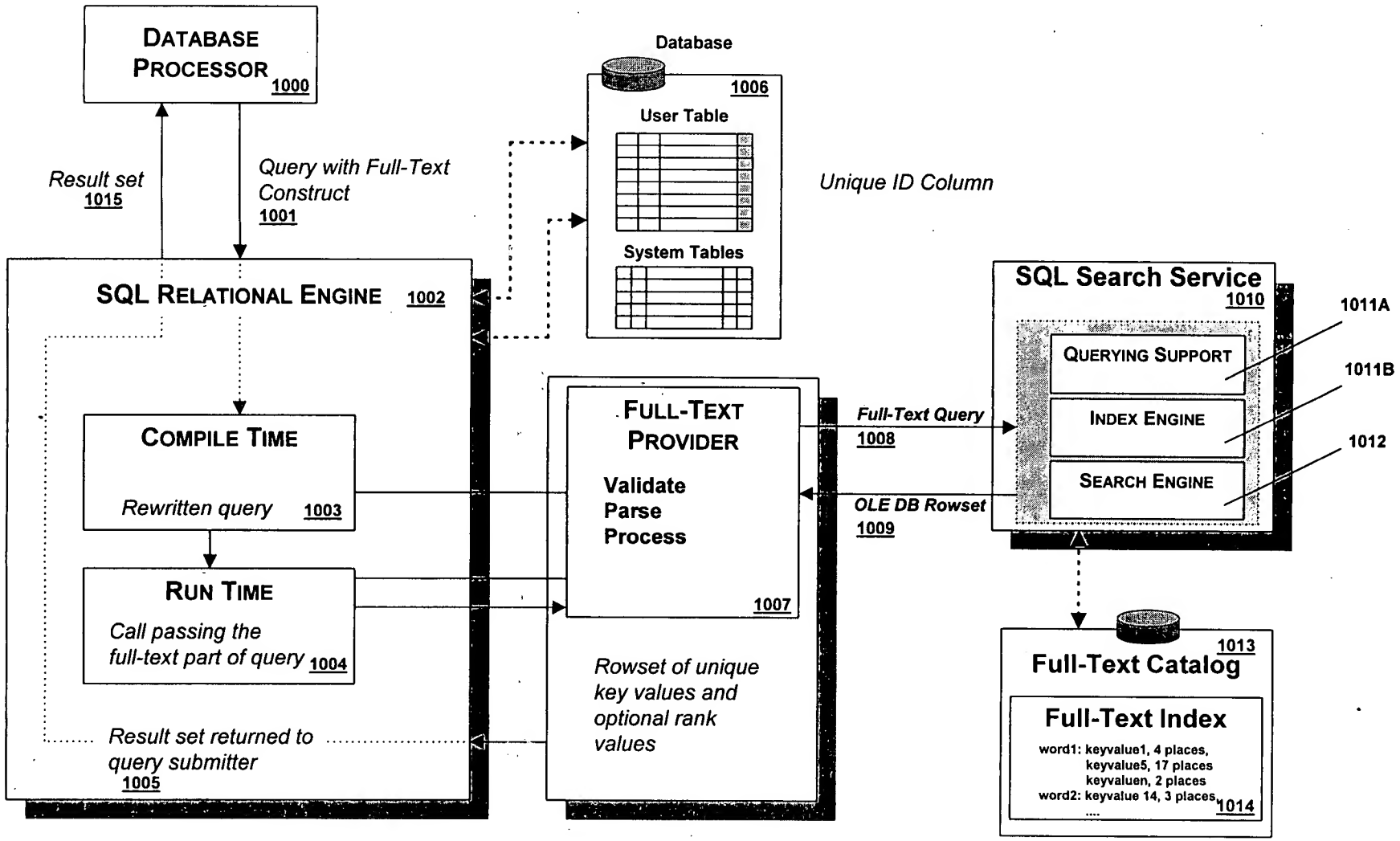

DATABASE PROCESSOR 1000
Result set 1015
Query with Full-Text Construct 1001
SQL RELATIONAL ENGINE 1002
COMPILE TIME
Rewritten query 1003
RUN TIME
Call passing the full-text part of query 1004
Result set returned to query submitter 1005
Database
1006
User Table
System Tables
Unique ID Column
FULL-TEXT PROVIDER
Validate
Parse
Process
1007
Rowset of unique key values and optional rank values
Full-Text Query 1008
OLE DB Rowset 1009
SQL Search Service 1010
QUERYING SUPPORT
INDEX ENGINE
SEARCH ENGINE
1011A
1011B
1012
1013
Full-Text Catalog
Full-Text Index
word1: keyvalue1, 4 places,
keyvalue5, 17 places
keyvaluen, 2 places
word2: keyvalue 14, 3 places
....
1014

Fig. 10

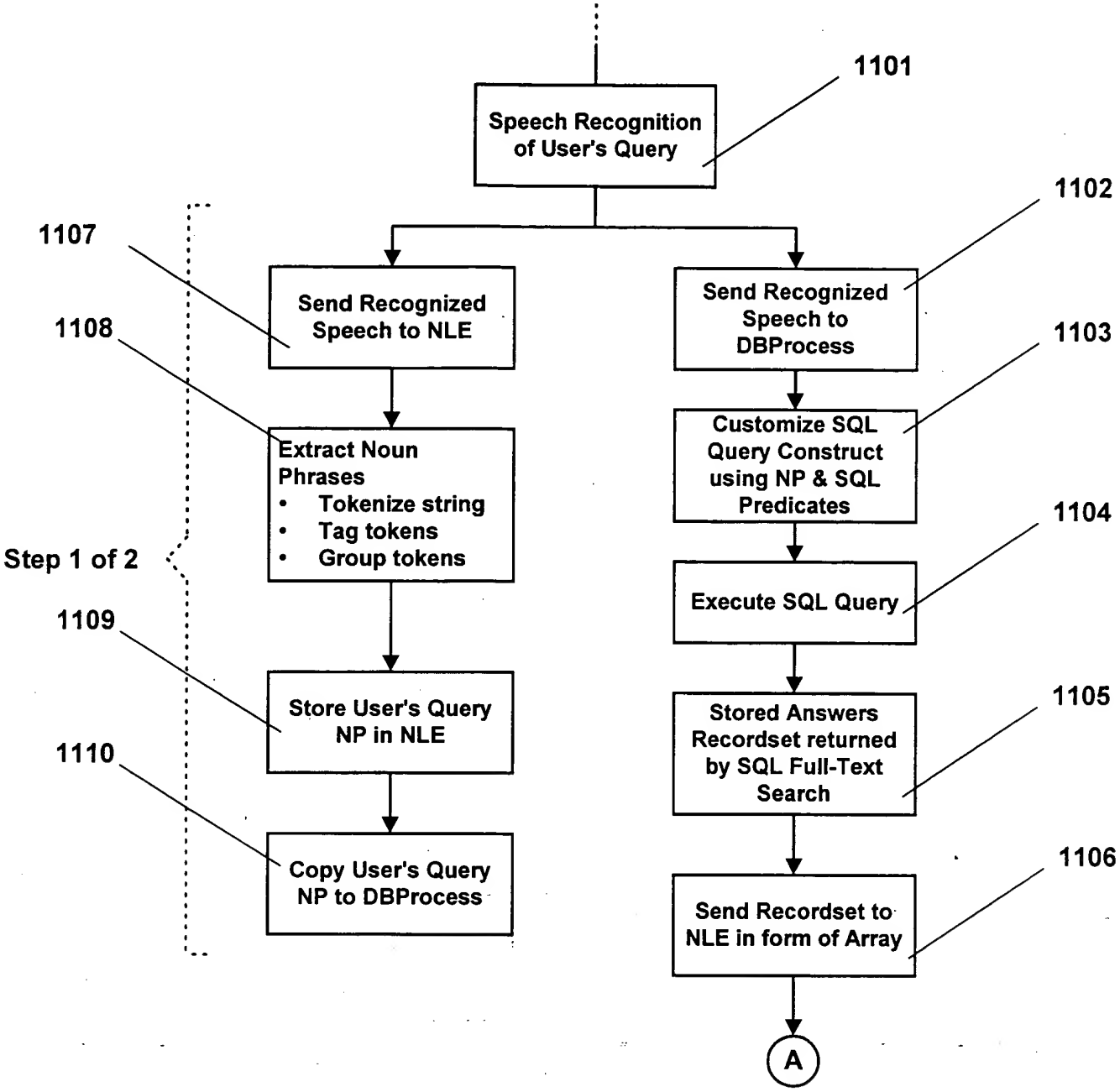

1101
Speech Recognition of User's Query
1102
1107
Send Recognized Speech to NLE
Send Recognized Speech to DBProcess
1103
1108
Extract Noun Phrases
• Tokenize string
• Tag tokens
• Group tokens
Customize SQL Query Construct using NP & SQL Predicates
1104
Step 1 of 2
Execute SQL Query
1109
Store User's Query NP in NLE
Stored Answers Recordset returned by SQL Full-Text Search
1105
1110
Copy User's Query NP to DBProcess
1106
Send Recordset to NLE in form of Array
A

Fig. 11A

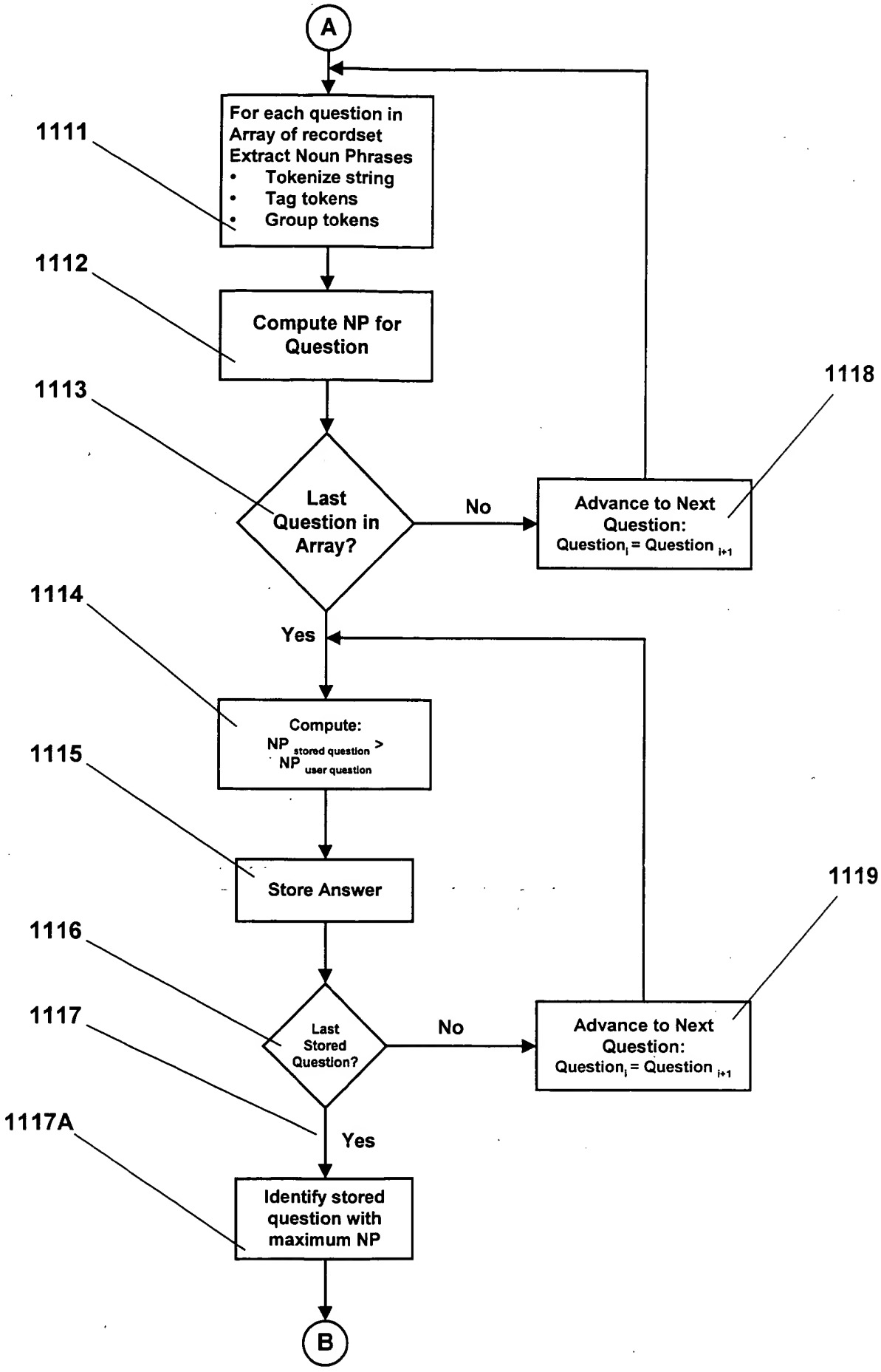

A
For each question in Array of recordset Extract Noun Phrases
• Tokenize string
• Tag tokens
• Group tokens
1111
1112
Compute NP for Question
1113
Last Question in Array?
No
Advance to Next Question: Question$_i$ = Question $_{i+1}$
1118
Yes
1114
Compute: NP $_{stored\ question}$ > NP $_{user\ question}$
1115
Store Answer
1116
Last Stored Question?
No
Advance to Next Question: Question$_i$ = Question $_{i+1}$
1119
1117
Yes
1117A
Identify stored question with maximum NP
B

Fig. 11B

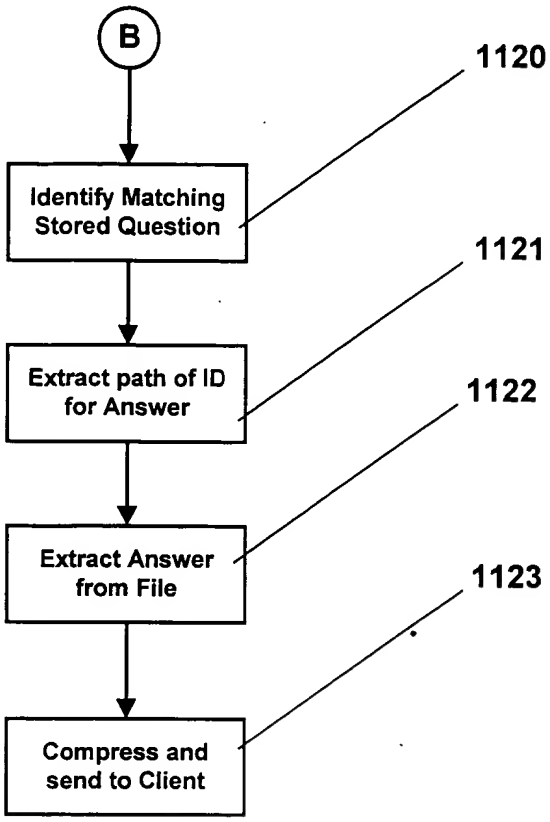

B
1120
Identify Matching Stored Question
1121
Extract path of ID for Answer
1122
Extract Answer from File
1123
Compress and send to Client

Fig. 11C

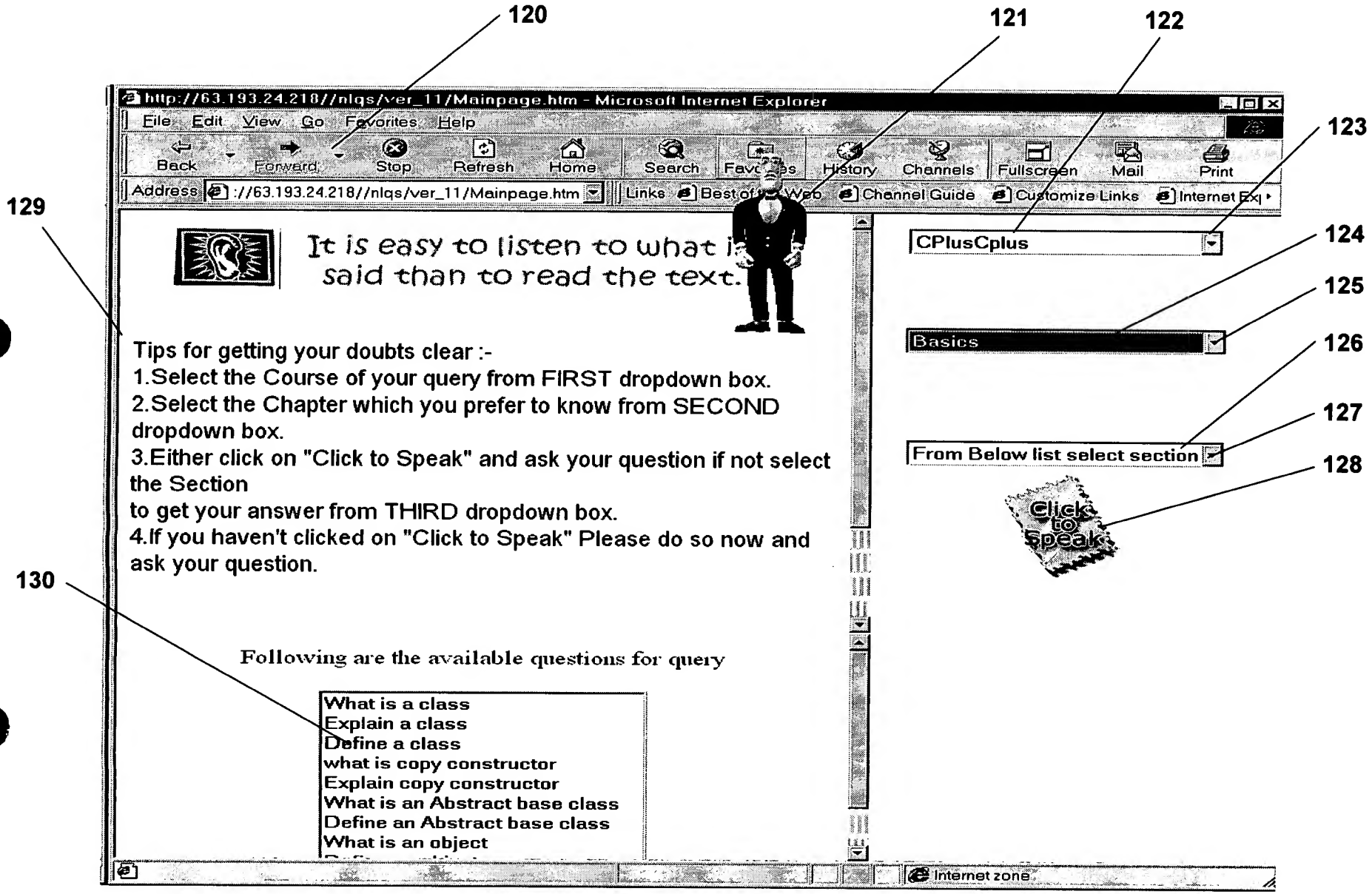
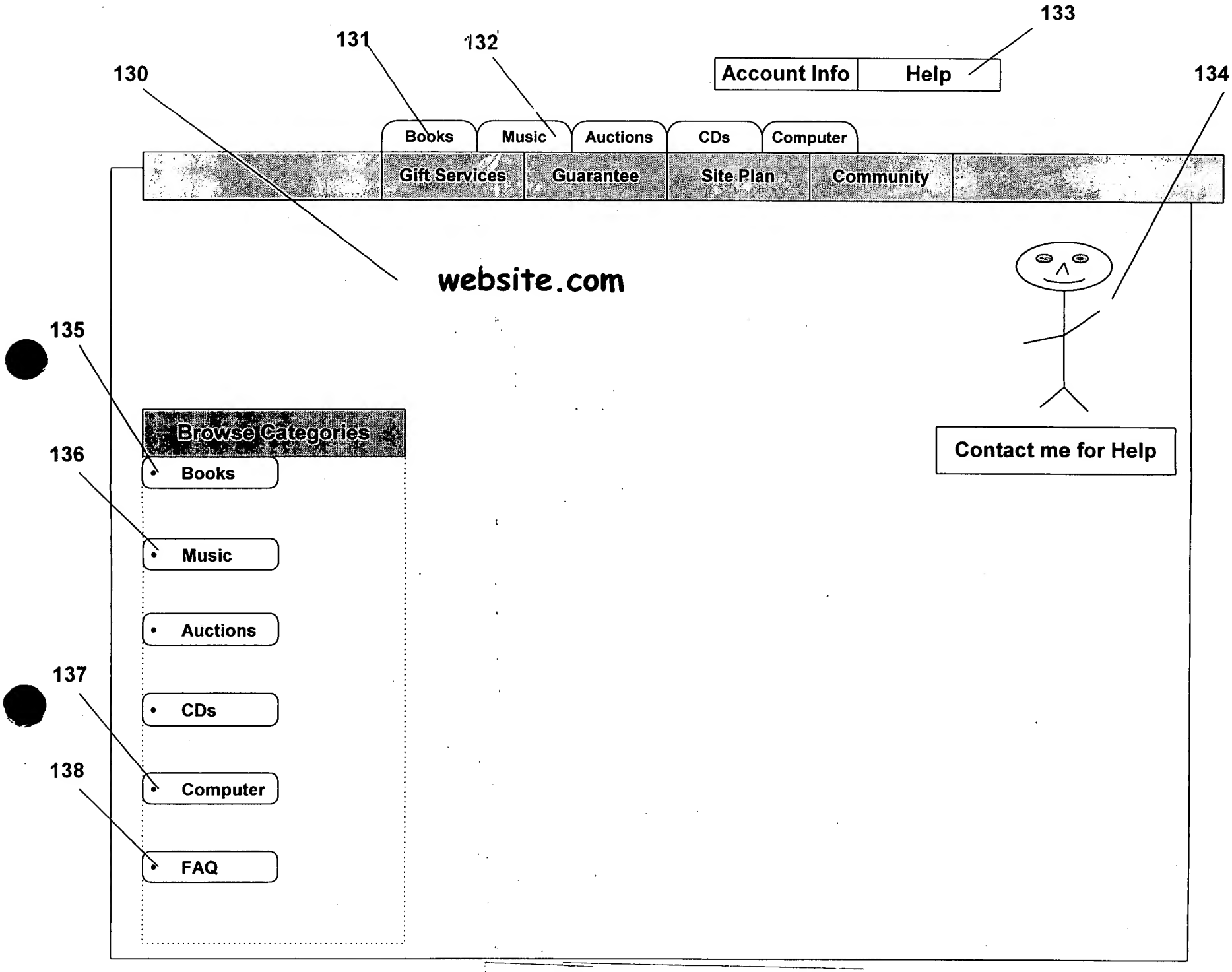
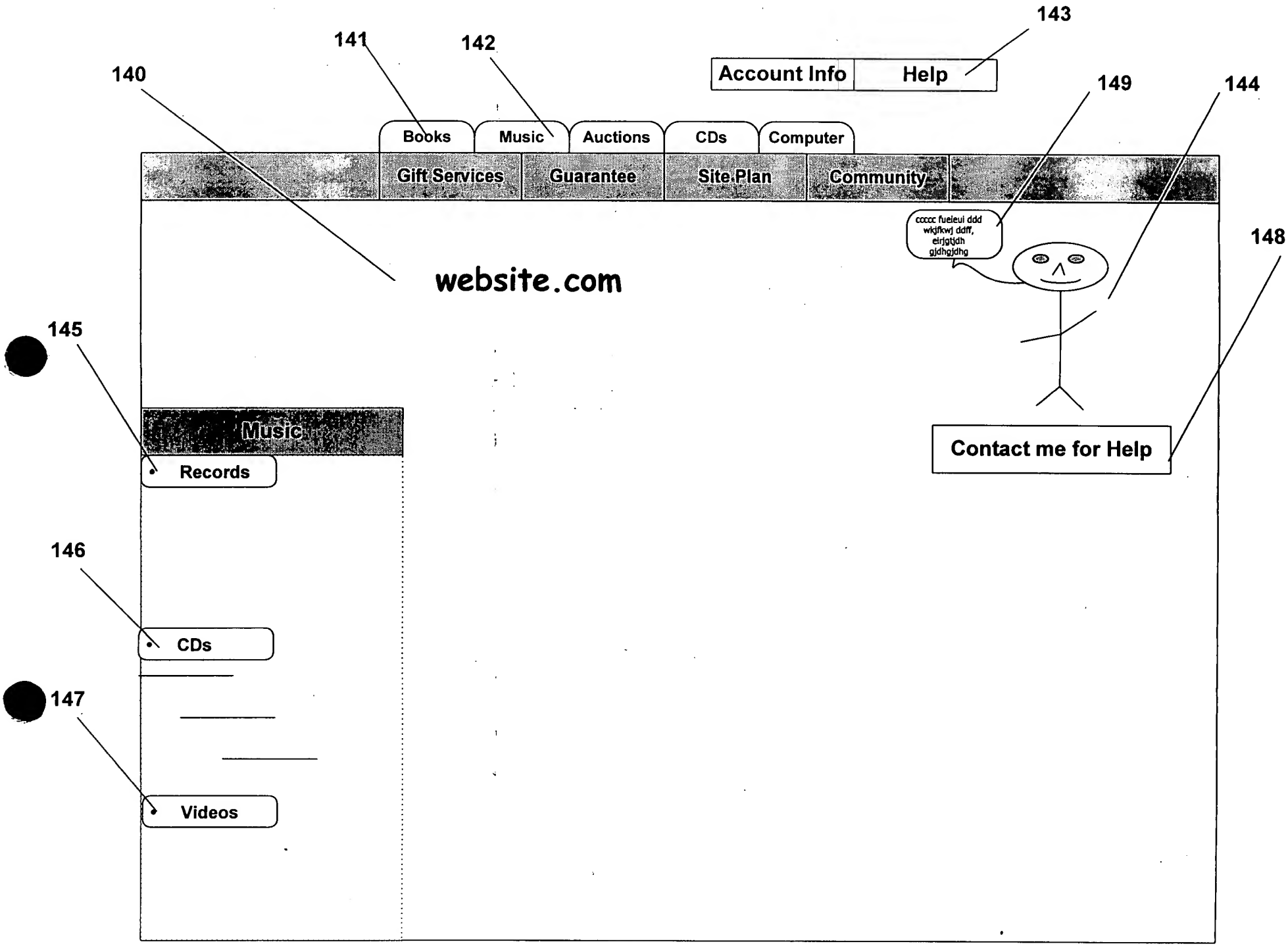
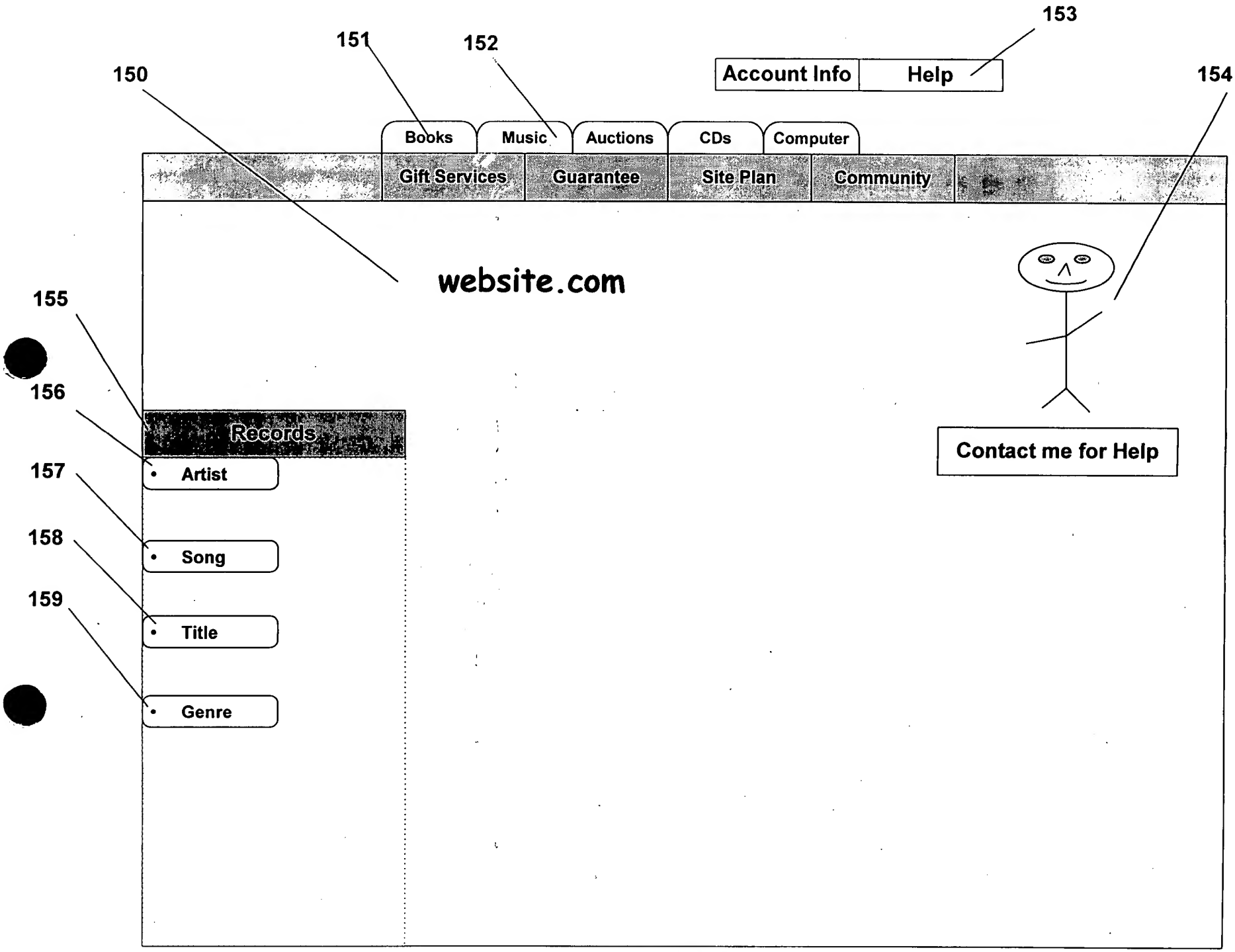
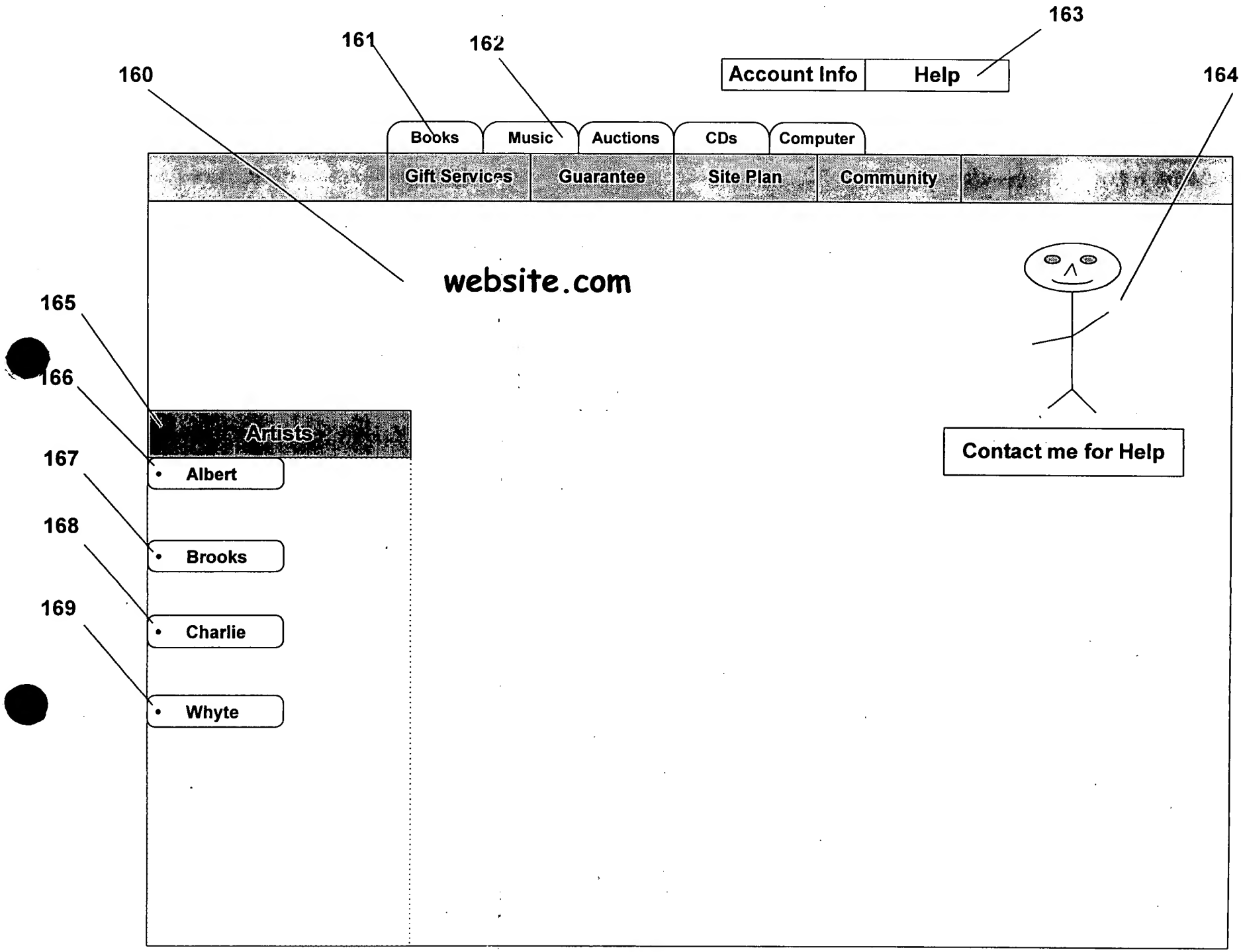

120
121
122
123
124
125
126
127
128
129
130
http://63.193.24.218//nlqs/ver_11/Mainpage.htm - Microsoft Internet Explorer
File Edit View Go Favorites Help
Back Forward Stop Refresh Home Search History Channels Fullscreen Mail Print
Address ://63.193.24.218//nlqs/ver_11/Mainpage.htm
Links Channel Guide Customize Links
It is easy to listen to what i said than to read the text.
CPlusCplus
Basics
From Below list select section
Click to Speak
Tips for getting your doubts clear :-
1.Select the Course of your query from FIRST dropdown box.
2.Select the Chapter which you prefer to know from SECOND dropdown box.
3.Either click on "Click to Speak" and ask your question if not select the Section
to get your answer from THIRD dropdown box.
4.If you haven't clicked on "Click to Speak" Please do so now and ask your question.
Following are the available questions for query
What is a class
Explain a class
Define a class
what is copy constructor
Explain copy constructor
What is an Abstract base class
Define an Abstract base class
What is an object
Internet zone

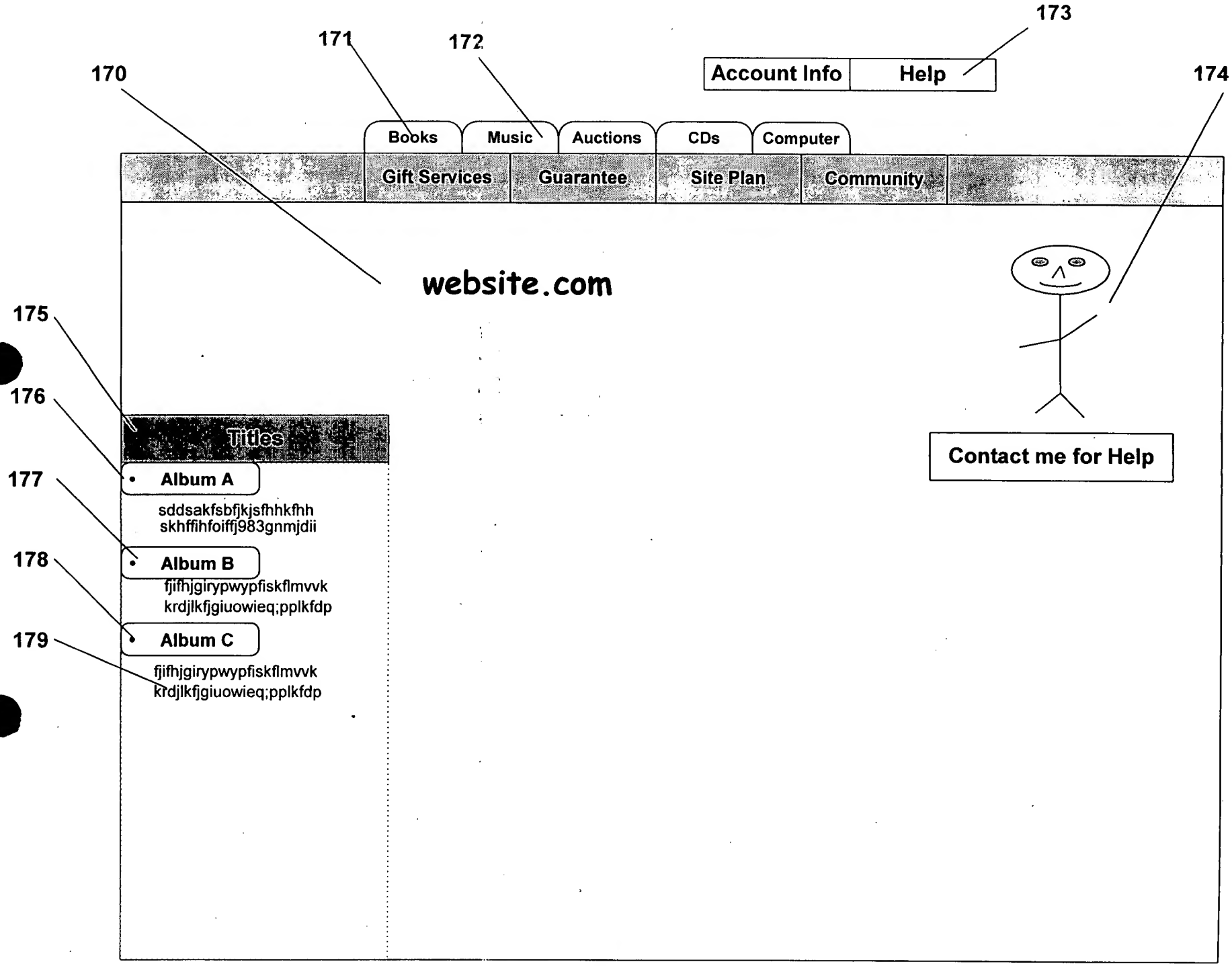
Fig. 12


130
131
132
133
134
135
136
137
138
Account Info
Help
Books
Music
Auctions
CDs
Computer
Gift Services
Guarantee
Site Plan
Community
website.com
Browse Categories
Books
Music
Auctions
CDs
Computer
FAQ
Contact me for Help


140
141
142
143
144
145
146
147
148
149
Account Info
Help
Books
Music
Auctions
CDs
Computer
Gift Services
Guarantee
Site Plan
Community
website.com
cccc fueleui ddd wkjfkwj ddff, eirjgtjdh gjdhgjdhg
Contact me for Help
Music
Records
CDs
Videos


150
151
152
153
154
155
156
157
158
159
Account Info
Help
Books
Music
Auctions
CDs
Computer
Gift Services
Guarantee
Site Plan
Community
website.com
Records
Artist
Song
Title
Genre
Contact me for Help


160
161
162
163
164
165
166
167
168
169
Account Info
Help
Books
Music
Auctions
CDs
Computer
Gift Services
Guarantee
Site Plan
Community
website.com
Artists
Albert
Brooks
Charlie
Whyte
Contact me for Help


170
171
172
173
174
175
176
177
178
179
Account Info
Help
Books
Music
Auctions
CDs
Computer
Gift Services
Guarantee
Site Plan
Community
website.com
Titles
Album A
sddsakfsbfjkjsfhhkfhh
skhffihfoiffj983gnmjdii
Album B
fjifhjgirypwypfiskflmvvk
krdjlkfjgiuowieq;pplkfdp
Album C
fjifhjgirypwypfiskflmvvk
krdjlkfjgiuowieq;pplkfdp
Contact me for Help

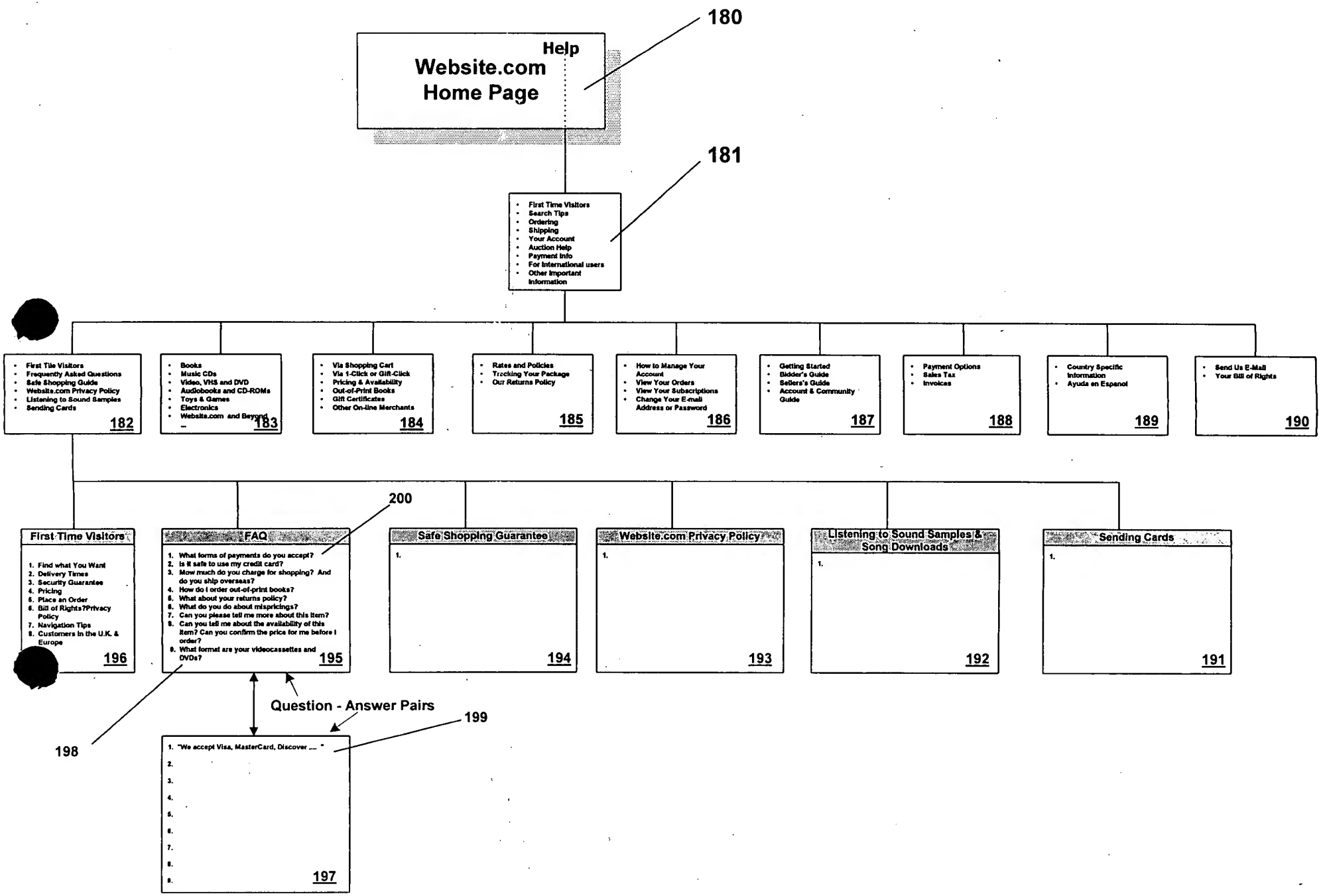

Help
Website.com
Home Page
180
181
First Time Visitors
Search Tips
Ordering
Shipping
Your Account
Auction Help
Payment Info
For International users
Other Important Information
First Tile Visitors
Frequently Asked Questions
Safe Shopping Guide
Website.com Privacy Policy
Listening to Sound Samples
Sending Cards
182
Books
Music CDs
Video, VHS and DVD
Audiobooks and CD-ROMs
Toys & Games
Electronics
Website.com and Beyond
183
Via Shopping Cart
Via 1-Click or Gift-Click
Pricing & Availability
Out-of-Print Books
Gift Certificates
Other On-line Merchants
184
Rates and Policies
Tracking Your Package
Our Returns Policy
185
How to Manage Your Account
View Your Orders
View Your Subscriptions
Change Your E-mail Address or Password
186
Getting Started
Bidder's Guide
Sellers's Guide
Account & Community Guide
187
Payment Options
Sales Tax
Invoices
188
Country Specific Information
Ayuda en Espanol
189
Send Us E-Mail
Your Bill of Rights
190
First Time Visitors
1. Find what You Want
2. Delivery Times
3. Security Guarantee
4. Pricing
5. Place an Order
6. Bill of Rights?Privacy Policy
7. Navigation Tips
8. Customers in the U.K. & Europe
196
200
FAQ
1. What forms of payments do you accept?
2. Is it safe to use my credit card?
3. How much do you charge for shopping? And do you ship overseas?
4. How do I order out-of-print books?
5. What about your returns policy?
6. What do you do about mispricings?
7. Can you please tell me more about this item?
8. Can you tell me about the availability of this item? Can you confirm the price for me before I order?
9. What format are your videocassettes and DVDs?
195
Safe Shopping Guarantee
1.
194
Website.com Privacy Policy
1.
193
Listening to Sound Samples & Song Downloads
1.
192
Sending Cards
1.
191
Question - Answer Pairs
198
199
1. "We accept Visa, MasterCard, Discover ... "
2.
3.
4.
5.
6.
7.
8.
9.
197

Fig. 18